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A Bibliography of the Blackfin Tuna, *Thunnus atlanticus* (Lesson)

GRANT L. BEARDSLEY AND DAVID C. SIMMONS

SEATTLE, WA.
August 1971

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ABSTRACT

One hundred eighty-four references on the blackfin tuna, *Thunnus atlanticus* (Lesson), are listed. A subject index is included.

A Bibliography of the Blackfin Tuna, *Thunnus atlanticus* (Lesson)

By

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INTRODUCTION

This bibliography was assembled as part of an attempt to gather as much information as possible on a relatively unused tuna resource in the western Atlantic. Any paper, book, article, or other form of publication that mentioned blackfin tuna has been included. Also listed are works that we believe include information on blackfin even though the common or scientific names either were not given or were incorrect. We have attempted to include all pertinent literature from 1830, when the original description of the blackfin tuna was made, up through early 1970. Several unpublished papers and papers that we were unable to examine personally are listed separately at the end of the bibliography. A subject index is also included.

ACKNOWLEDGMENT

Our thanks to Elizabeth B. Leonard, librarian at the NMFS Tropical Atlantic Biological Laboratory, for her assistance in obtaining references.

BIBLIOGRAPHY

1. AMERICAN FISHERIES SOCIETY.
1948. A list of common and scientific names of the better known fishes of the United States and Canada. Am. Fish. Soc. Spec. Publ. 1, Trans. Am. Fish. Soc. 75: 353-398.
2. 1960. A list of common and scientific names of fishes from the United States and Canada. Am. Fish. Soc. Spec. Publ. 2, 102 p.
3. ANDERSON, A. W., W. H. STOLTING, and ASSOCIATES.
1953. Survey of the domestic tuna industry. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 104, 436 p.
4. ANDERSON, W. W., and J. W. GEHRINGER.
1957. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, *Theodore N. Gill* Cruise 3. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 210, 208 p.
5. 1957. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, M/V *Theodore N. Gill* Cruise 4. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 234, 192 p.
6. 1958. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, M/V *Theodore N. Gill* Cruise 5. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 248, 220 p.

7. 1958. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, M/V *Theodore N. Gill* Cruise 6. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 265, 99 p.
8. 1959. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, M/V *Theodore N. Gill* Cruise 7. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 278, 277 p.
9. 1959. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, M/V *Theodore N. Gill* Cruise 8. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 303, 227 p.
10. 1959. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, M/V *Theodore N. Gill* Cruise 9. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 313, 226 p.
11. ANDERSON, W. W., J. W. GEHRINGER, and E. COHEN.
1956. Physical oceanographic, biological, and chemical data, South Atlantic coast of the United States, *Theodore N. Gill* Cruise 2. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 198, 270 p.
12. BANE, G. W., JR.
1965. Exploratory fishing for tunas in the Mona Passage. Proc. Gulf Caribb. Fish. Inst., 17th Annu. Sess., p. 55-61.
13. 1965. Notes on exploratory fishing and the biology of the blackfin tuna around Puerto Rico. Proc. 9th Int. Gamefish Conf., p. 12-16.
14. BAUGHMAN, J. L.
1941. Scombriformes, new, rare, or little known in Texas waters with notes on their natural history or distribution. Trans. Tex. Acad. Sci. 24: 14-26.
15. 1950. Potentialities of the Gulf of Mexico fisheries and recommendations for their realization. Proc. Gulf Caribb. Fish. Inst., 2d Annu. Sess., p. 118-126.
16. BEARDSLEY, G. L., JR., and W. J. RICHARDS.
1970. Size, seasonal abundance, and length-weight relation of some scombrid fishes from southeast Florida. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 595, 6 p.
17. BEEBE, W.
1936. Food of the Bermuda and West Indian tunas of the genera *Parathunnus* and *Neothunnus*. Zoologica (New York) 21: 195-205.
18. BEEBE, W., and G. HOLLISTER.
1935. The fishes of Union Island, Grenadines, British West Indies, with the description of a new species of stargazer. Zoologica (New York) 19: 209-224.
19. BEEBE, W., and J. TEE-VAN.
1928. The fishes of Port-au-Prince Bay, Haiti. Zoologica (New York) 10: 1-279.
20. 1936. Systematic notes on Bermudian and West Indian tunas of the genera *Parathunnus* and *Neothunnus*. Zoologica (New York) 21: 177-194.
21. BRIGGS, J. C.
1958. A list of Florida fishes and their distribution. Bull. Fla. State Mus. Biol. Sci. 2: 223-318.
22. BROWN, H. H.
1946. The fisheries of the Windward and Leeward Islands. Development and welfare in the West Indies. Dev. Welfare Bull. 20: 1-97.
23. BUESA, R. J.
1964. Las pesquerías Cubanas. Cent. Invest. Pesq., Inst. Nac. Pesca, Cont. 20, 93 p.
24. BULLIS, H. R., JR., and F. J. MATHER, III.
1956. Tunas of the genus *Thunnus* of the northern Caribbean. Am. Mus. Novit. 1765, 12 p.
25. BULLIS, H. R., JR.
1955. Recent explorations for yellowfin in the Gulf of Mexico. Proc. Gulf Caribb. Fish. Inst., 7th Annu. Sess., p. 64-67.
26. 1955. Preliminary report on exploratory long-line fishing for tuna in the Gulf of Mexico and the Caribbean Sea. Part I Exploratory fishing by the *Oregon*. Commer. Fish. Rev. 17(10): 1-15.

27. BULLIS, H. R., JR., and J. R. THOMPSON.
1967. Progress in exploratory fishing and gear research in Region 2, fiscal year 1966. U.S. Fish Wildl. Serv., Circ. 265, 14 p.
28. BUREAU OF COMMERCIAL FISHERIES.
1961. Fishing log M/V *Delaware* — offshore long-line explorations northwest Atlantic 1957-60. Bur. Commer. Fish. Explor. Fish. Gear Res. Base, Gloucester, Mass., 10 p. [Processed.]
29. CASCUDO, L. C.
1957. Jangadeiros. Serviço de Informação Agrícola, Rio de Janeiro, 60 p.
30. COLLETTE, B. B., and R. H. GIBBS, JR.
1962. A preliminary review of the fishes of the family Scombridae. FAO Fish. Rep. 6: 23-32.
31. 1965. Blackfin tuna. *In* A. J. McClane (editor), McClane's standard fishing encyclopedia and international angling guide, p. 113-114. Holt, Rinehart, and Winston, Inc., New York, N.Y., Chicago, Ill., and San Francisco, Calif., 1,057 p.
32. COMMERCIAL FISHERIES REVIEW.
1950. "Oregon" locates little tuna, shrimp, and flatfish. Commer. Fish. Rev. 12(7): 22-23.
33. 1951. "Oregon" explores for red and grooved shrimp and looks for tuna (Cruise No. 11). Commer. Fish. Rev. 13(11): 20-21.
34. 1952. Second phase of oceanographic studies of Gulf of Mexico begun by M/V "Alaska" (Cruise I-2). Commer. Fish. Rev. 14(2): 35-36.
35. 1952. "Oregon" explores for tuna in Gulf (Trip No. 14). Commer. Fish. Rev. 14(8): 18-19.
36. 1952. "Oregon" catches tuna with trolling gear in Gulf (Trip No. 15). Commer. Fish. Rev. 14(11): 16.
37. 1953. Tuna bait grounds found by "Oregon" in Gulf (Cruise No. 19). Commer. Fish. Rev. 15(7): 25-26.
38. 1953. Bluefin tuna caught in northern Gulf of Mexico by "Oregon". Commer. Fish. Rev. 15(11): 32.
39. 1954. Yellowfin tuna discovered in Gulf by "Oregon" (Cruise 23). Commer. Fish. Rev. 16(8): 30-31.
40. 1954. More yellowfin tuna caught in Gulf by "Oregon" (Cruise 24). Commer. Fish. Rev. 16(10): 26-27.
41. 1954. "Oregon" catches 102 large yellowfin tuna (Cruise 26). Commer. Fish. Rev. 16(11): 32.
42. 1955. Yellowfin tuna caught in December by "Oregon" (Cruise 27A). Commer. Fish. Rev. 17(2): 25.
43. 1955. "Oregon" catches large yellowfin tuna in Gulf (Cruise 31). Commer. Fish. Rev. 17(8): 21.
44. 1956. Experimental long-line tuna fishing in north-central Gulf by M/V "Oregon" (Cruise 40). Commer. Fish. Rev. 18(9): 20.
45. 1956. Gear research activities by M/V "George M. Bowers" (Cruise 5). Commer. Fish. Rev. 18(9): 36.
46. 1957. Good catch of yellowfin tuna made in Gulf (M/V "Oregon", Cruise 41). Commer. Fish. Rev. 19(1): 41-42.
47. 1957. Shrimp, tuna, and live-bait explorations off Central America (M/V "Oregon" Cruise 46). Commer. Fish. Rev. 19(12): 23-24.
48. 1958. Tuna fishing explorations continued in western North Atlantic (M/V *Delaware* Cruises 58-3 and 58-4). Commer. Fish. Rev. 20(9): 47-48.
49. 1960. Tuna distribution in southeastern Caribbean Sea and occurrence of royal-red shrimp off Trinidad explored: M/V "Oregon" Cruise 66. Commer. Fish. Rev. 22(7): 30-31.
50. 1962. Migrations in North Atlantic studied by R/V "Crawford". Commer. Fish. Rev. 24(2): 41-42.
51. 1962. Jamaica. Tuna landed in November-December 1961. Commer. Fish. Rev. 24(7): 69-70.
52. 1962. Western Caribbean Sea potentially-valuable species assessed: M/V "Oregon" Cruise 78. Commer. Fish. Rev. 24(8): 24-25.
53. 1962. Blackfin tuna studied to determine Federal specification requirements. Commer. Fish. Rev. 24(9): 43.
54. 1962. International. World meeting on tuna biology urges expansion of tuna

research. Commer. Fish. Rev. 24(10): 39-41.
55. 1963. Progress made in the identification of tuna larvae and juveniles. Commer. Fish. Rev. 25(1): 25-26.
56. 1964. Cuba. Catch and fishing fleet expanded. Commer. Fish. Rev. 26(11): 82-83.
57. 1965. Fishery resource survey continued: M/V "Oregon" Cruise 94. Commer. Fish. Rev. 27(1): 19-22.
58. 1965. Commercial availability of swordfish and tuna to long-line gear investigated: M/V "Oregon" Cruise 100. Commer. Fish. Rev. 27(7): 47-48.
59. 1965. Fishery resource potentials in southern Bahama area explored: M/V "Oregon" Cruise 101. Commer. Fish. Rev. 27(9): 43-44.
60. 1965. Long-lining for swordfish in Bahama area tested: M/V "Oregon" Cruise 102. Commer. Fish. Rev. 27(10): 52-54.
61. 1966. Trawling explorations in southern Caribbean: M/V "Oregon" Cruise 104. Commer. Fish. Rev. 28(1): 23-24.
62. 1966. Live bait distribution and tuna studies: M/V "Geronimo" Cruise 5. Commer. Fish. Rev. 28(4): 38-41.
63. 1966. Fish pump tested in Caribbean fisheries: M/V "Oregon" Cruise 107. Commer. Fish. Rev. 28(7): 17-19.
64. 1966. Biology and ecology of tuna and live bait investigations: R/V "Geronimo" Cruise 7. Commer. Fish. Rev. 28(7): 48-52.
65. 1966. Migrations and seasonal distribution of pelagic fish in Florida Straits studied: M/V "Oregon" Cruise 109. Commer. Fish. Rev. 28(8): 45-46.
66. 1967. "Undaunted" explores for tunas. Commer. Fish. Rev. 29(5): 20-21.
67. 1967. "Oregon" explores eastern Caribbean. Commer. Fish. Rev. 29(8, 9): 23-24.
68. 1967. "Undaunted" studies surface tunas and bait in western Caribbean. Commer. Fish. Rev. 29(8, 9): 28-29.
69. 1967. UNDP/FAO Caribbean Fishery Project Report, June 1967. Commer. Fish. Rev. 29(8, 9): 38-40.
70. 1970. Japan. Vessel completes tuna survey in South Atlantic. Commer. Fish. Rev. 32(5): 55-56.
71. CRUZ, J. F. da.
1965. Contribuição ao estudo da biologia pesqueira da albacora *Thunnus atlanticus* (Lesson) no nordeste do Brasil. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 2: 33-40. [Trop. Atl. Biol. Lab., Miami, Fla., Transl. 11.]
72. 1967. Análises da pesca da albacora *Thunnus atlanticus* (Lesson) no estado do Rio Grande do Norte. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 4: 43-55.
73. CRUZ, J. F. da, and M. P. PAIVA.
1964. Sôbre a biologia pesqueira da albacora, *Thunnus atlanticus* (Lesson), no nordeste do Brasil. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 1: 1-15. [Trop. Atl. Biol. Lab., Miami, Fla., Transl. 11.]
74. 1964. Notas sôbre a alimentação de *Thunnus atlanticus* (Lesson) ao largo do nordeste brasileiro. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 1: 33-39.
75. CUBILLAS, V.
1966. Nuevos horizontes en la pesca del bonito. Mar Pesca, March 1966, p. 4-11.
76. CUVIER, G., and A. VALENCIENNES.
1831. Histoire naturelle des poissons. Paris. 8, 509 p.
77. DE SYLVA, D.P.
1955. The osteology and phylogenetic relationships of the blackfin tuna, *Thunnus atlanticus* (Lesson). Bull. Mar. Sci. Gulf Caribb. 5: 1-41.
78. DE SYLVA, D.P., and W. F. RATHJEN.
1961. Life history notes on the little tuna, *Euthynnus alletteratus*, from the southeastern United States. Bull. Mar. Sci. Gulf Caribb. 11: 161-190.
79. DICK, M. M.
1964. Scombroid fishes in the Museum of Comparative Zoology, Harvard University. Proc. Symp. Scombroid Fishes, Mar. Biol. Assoc. India, Sympos. Ser. 1: 459-460.
80. DRAGOVICH, A.
1969. Review of studies of tuna food in the Atlantic Ocean. U.S. Fish Wildl.

Serv., Spec. Sci. Rep. Fish. 593, 21 p.
81. DRAGOVICH, A., and J. P. WISE.
1969. Relations between length of the pen and other measurements in the squid *Lolliguncula brevis*. J. Fish. Res. Board Can. 26: 1676-1679.
82. ERDMAN, D. S.
1956. Recent fish records from Puerto Rico. Bull. Mar. Sci. Gulf Caribb. 6: 315-340.
83. 1957. Marlin fishing in Puerto Rican waters. Proc. 2d Int. Gamefish Conf., 15 p.
84. 1958. Foods of pelagic fishes from Puerto Rico and the Bahama Islands. Proc. 3d Int. Gamefish Conf., 12 p.
85. 1962. The sport fishery for blue marlin off Puerto Rico. Trans. Am. Fish. Soc. 91: 225-227.
86. ERDMAN, D. S., and R. E. MAYTAG.
1957. The nylon longline as a method for game fish research by small craft. Proc. 2d Int. Gamefish Conf., 5 p.
87. ERDMAN, D. S., and E. ROMAN.
1959. Puerto Rico gamefishing. Sea Front. 5: 114-122.
88. FERNANDEZ-YEPEZ, A., and E. J. SANTAELLA.
1956. Presencia de atunes en Venezuela. Soc. Venez. Activ. Submar., Pub. Ocas. Bol. 1(1), 29 p.
89. FIEDLER, R. H., M. J. LOBELL, and C. R. LUCAS.
1947. The fisheries and fishery resources of the Caribbean area. U.S. Fish Wildl. Serv., Fish. Leafl. 259, 210 p.
90. FISHING NEWS INTERNATIONAL.
1970. Blackfin may be added to Japan's tuna catch. Fish. News Int. 9(6): 20.
91. FONSÊCA, J. B. G. DA, and A. C. BARROS.
1963. Sôbre as pescarias de atuns e afins e suas áreas de ocorrência no Atlântico tropical no biência 1961-1962. Bol. Estud. Pesca 3(7): 18-25.
92. FOWLER, H. W.
1934. The buckler dory and descriptions of three new fishes from off New Jersey and Florida. Proc. Acad. Natur. Sci. Philadelphia 86: 353-361.
93. 1944. Results of the fifth George Vanderbilt Expedition (1941). The fishes. Monogr. Acad. Nat. Sci. Philadelphia 6: 57-583.
94. FRANCIS, P.
1955. Florida fish and fishing. The Macmillan Co., New York, 230 p.
95. 1963. Saltwater fishing from Maine to Texas. The Macmillan Co., New York, 243 p.
96. GABRIELSON, I. N. (EDITOR).
1954. Bermuda or black-finned tuna. *In* The fisherman's encyclopedia, p. 22. Telegraph Press, Harrisburg, Pa., 698 p.
97. GIBBS, R. H., JR., and B. B. COLLETTE.
1967. Comparative anatomy and systematics of the tunas, genus *Thunnus*. U.S. Fish Wildl. Serv., Fish. Bull. 66: 65-130.
98. GORBUNOVA, N. N., and D. SALABARRIA.
1967. Reprocuccion de los peces del suborden Scombroidei (Pisces, Scombroidei) en las regiones occidentales del Atlantico (Reproduction of scombroid fishes (Pisces, Scombroidei) in western regions of the Atlantic Ocean). Sovet.—Kubinskie Rybokhoz. Issled. Investigaciones Pesqueras Soviético-Cubanas. Pischevaya Promyshlennost, Moscow, p. 120-131. [Inter-American Tropical Tuna Commission translation, La Jolla, Calif.]
99. GÜNTHER, A.
1860. Catalogue of the acanthopterygian fishes in the collection of the British Museum. 2,548 p. London.
100. HOWELL-RIVERO, L.
1953. Los escámbudas en Cuba: su biologia e industrializacion. Cent. Invest. Pesq., Inst. Nac. Pesca, Cont. 2, 105 p.
101. IDYLL, C. P., and D. P. DE SYLVA.
1963. Synopsis of biological data on the blackfin tuna, *Thunnus atlanticus* (Lesson) 1830 (western Atlantic). FAO Fish. Rep. 6: 761-770.
102. IWAI, T., I. NAKAMURA, and K. MATSUBARA.
1965. Taxonomic study of the tunas. Misaki Mar. Biol. Inst., Spec. Rep. 2: 1-51. [In Japanese with English summary; Bur. Commer. Fish. Ichthyol. Lab. Transl. 38.]

103. IWAMOTO, T.
1965. Summary of tuna observations in the Gulf of Mexico on cruises of the exploratory fishing vessel *Oregon*, 1950-63. Commer. Fish. Rev. 27(1): 7-14.
104. JAEN, R.
1964. Fishing in the Caribbean. Editorial Arte, Caracas, 238 p.
105. JORDAN, D. S., and B. W. EVERMANN.
1926. A review of the giant mackerel-like fishes, tunnies, spearfishes and swordfishes. Occas. Pap. Calif. Acad. Sci. 12: 1-113.
106. JORDAN, D. S., B. W. EVERMANN, and H. W. CLARK.
1930. Check list of the fishes and fish-like vertebrates of North and Middle America north of the northern boundary of Venezuela and Colombia. U.S. Comm. Fish., Rep. for 1928, Pt. 2, 670 p.
107. KLAWE, W. L.
1960. Larval tunas from the Florida Current. Bull. Mar. Sci. Gulf Caribb. 10: 227-233.
108. 1961. Young scombroids from the waters between Cape Hatteras and Bahama Islands. Bull. Mar. Sci. Gulf Caribb. 11: 150-157.
109. KLAWE, W. L., and B. M. SHIMADA.
1959. Young scombroid fishes from the Gulf of Mexico. Bull. Mar. Sci. Gulf Caribb. 9: 100-115.
110. KRUMHOLZ, L. A., and D. P. DESYLVA.
1958. Some foods of marlins near Bimini, Bahamas. Bull. Am. Mus. Nat. Hist. 114(5): 406-411.
111. LAEVASTU, T., and H. ROSA, JR.
1963. Distribution and relative abundance of tunas in relation to their environment. FAO Fish. Rep. 6: 1835-1851.
112. LAMONTE, F.
1952. Marine game fishes of the world. Doubleday and Company, Inc., New York, 190 p.
113. LESSON, R. P.
1830. Les poissons. *In* L. I. Duperry, (editor), Voyage autour du monde exécuté sur la corvette "La Coquille", pendant les anneés 1822-25. Zoologie 2, p. 66-238. Paris.
114. MAR Y PESCA.
1957. Productos explotables de la pesca. Mar Pesca, April 1957, p. 5-7.
115. 1965. Atunes y bonitos. Mar Pesca, October 1965, p. 27-29.
116. MATHER, F. J., III.
1952. Sport fishes of the vicinity of the Gulf of Honduras, certain Caribbean Islands, and Carmen, Mexico. Proc. Gulf Caribb. Fish. Inst., 4th Annu. Sess., p. 118-129.
117. 1964. Tunas (genus *Thunnus*) of the western North Atlantic. Part II Description, comparison and identification of species of *Thunnus* based on external characters. Proc. Symp. Scombroid Fishes, Mar. Biol. Assoc. India, Sympos. Ser. 1: 395-409.
118. 1964. Tunas (genus *Thunnus*) of the western North Atlantic. Part III. Distribution and behavior of *Thunnus* species. Proc. Symp. Scombroid Fishes, Mar. Biol. Assoc. India, Sympos. Ser. 1: 411-426.
119. MATHER, F. J., III, and M. R. BARTLETT.
1962. Bluefin tuna concentration found during a long-line exploration of the northwestern Atlantic slope. Commer. Fish. Rev. 24(2): 1-7.
120. MATHER, F. J., III, and C. G. DAY.
1954. Observations of pelagic fishes of the tropical Atlantic. Copeia 1954: 179-188.
121. MATHER, F. J., III, and H. A. SCHUCK.
1952. Additional notes on the distribution of the blackfin tuna *(Parathunnus atlanticus)*. Copeia 1952: 267.
122. MIGDALSKI, E. C.
1958. Angler's guide to the salt water game fishes. Ronald Press Co., New York, 506 p.
123. MONTE, S.
1964. Observações sôbre a estrutura histológica das gônadas da albacora, *Thunnus atlanticus* (Lesson), no nordeste do Brasil. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 1: 17-31.
124. MORICE, J.
1953. La pêche des thons à Cuba. La

Pêche Mar., la Pêche Fluviale et la Piscicult. 907: October 1953, p. 438-442.

125. MORICE, J., and J. CADENAT.
1952. Distribution of fish species in the French West Indies. *In* Fisheries in the Caribbean. Caribb. Comm., Cent. Secr., Rep. Fish. Conf. Kent House, Trinidad, Mar. 24-28, 1952, Kent House, Port-of-Spain, Trinidad, p. 102-122.

126. MOWBRAY, L. S.
1950. The commercial and game fishing industries of Bermuda. Proc. Gulf Caribb. Fish. Inst., 2d Annu. Sess., p. 27-30.

127. 1956. The modified tuna long-line in Bermuda waters. Proc. Gulf Caribb. Fish. Inst., 8th Annu. Sess., p. 137-142.

128. 1956. The gamefishes of Bermuda. Proc. 1st Int. Gamefish Conf., 8 p.

129. NAKAMURA, I.
1965. Relationships of fishes referable to the subfamily Thunninae on the basis of the axial skeleton. Bull. Misaki Mar. Biol. Inst., Kyoto Univ. 8: 7-38.

130. NAKAMURA, I., and S. KIKAWA.
1966. Infra-central grooves of tunas with special reference to the identification of young tunas found in the stomachs of large predators. Rep. Nankai Reg. Fish. Res. Lab. 23: 55-66.

131. NIGRELLI, R. F., and H. W. STUNKARD.
1947. Studies on the genus *Hirudinella*, giant trematodes of scombriform fishes. Zoologica (New York) 31: 185-196.

132. NOMURA, H., and J. F. DA CRUZ.
1966. On the length and weight of *Thunnus atlanticus* (Lesson) from northeaster Brazil. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 3: 33-37.

133. 1967. On the length and weight of *Thunnus atlanticus* (Lesson) from northeastern Brazil. Arq. Estaç. Biol. Mar. Univ. Fed. Ceará 7(1): 91-94.

134. OSWALD, E. O.
1962. Report to the government of Puerto Rico on the resource appraisal project for the possible expansion of local fisheries. FAO Exp. Prog. Tech. Assis. 1482, 15 p.

135. 1963. Developing an offshore fishery in Jamaica. Proc. Gulf Caribb. Fish. Inst., 15th Annu. Sess., p. 134-139.

136. PAIVA, M. P.
1961. Recursos básicos da pesca marítima no nordeste brasileiro. Bol. Estaç. Biol. Mar. Univ. Fed. Ceará 3, 10 p.

137. 1962. Notas sôbre os atuns do Brasil. Arq. Mus. Nac., Rio de Janeiro 52: 145-150.

138. 1962. Actual status of the knowledge on the biology of tunas in offshore waters of the Brazilian coast. Bol. Estaç. Biol. Mar. Univ. Fed. Ceará 5, 10 p.

139. PARIN, N. V.
1968. Ichthyofauna of the epipelagic zone. (Ikhtiofauna okeanskoi epipelagiali). Academy of Science of the USSR. Institute of Oceanology, Izdatel'stvo "Nauka", Moskva. Translated from the Russian by M. Raveh, Israel Program for Scientific Translations Ltd., Jerusalem, 1970 (TT 69-59020): 206 p.

140. PERLMUTTER, A.
1961. Guide to marine fishes. New York University Press, 431 p.

141. POEY, F.
1868. Synopsis piscium Cubensium. Repert. Fish.-Nat. Cuba 2: 279-484.

142. 1875. Enumeratio piscium Cubensium. Pt. 1. An. Soc. Esp. Hist. Nat. 4: 113-161.

143. POSTEL, E.
1966. Les noms des Scombridés. La Pêche Maritime, August 1966, 7 p.

144. POTTHOFF, T., and W. J. RICHARDS.
1970. Juvenile bluefin tuna, *Thunnus thynnus* (Linnaeus), and other scombrids taken by terns in the Dry Tortugas, Florida. Bull. Mar. Sci. 20: 389-413.

145. RAMIS RAMOS, H.
1967. Principales metodos de pesca del atun. Invest. Atuneras Cubano-Sovieticas, Cont. 23: 3-28.

146. RAWLINGS, J. E.
1953. A report on the Cuban tuna

fishery. Commer. Fish. Rev. 15(1): 8-21.

147. RITZHAUPT, H.
1965. Las pesquerías de Cuba y algunas recomendaciones para su intensificación. Cent. Invest. Pesq., Inst. Nac. Pesca, Cont. 21: 110 p.

148. RIVAS, L. R.
1949. Check list of the Florida game and commercial marine fishes including those of the Gulf of Mexico and the West Indies, with approved common names. Fla. State Board Conserv., Educ. Ser. 4, 39 p.

149. 1951. A preliminary review of the western North Atlantic fishes of the family Scombridae. Bull. Mar. Sci. Gulf Caribb. 1: 209-230.

150. 1952. Occurrence and distribution of commercial fish species in various Caribbean territories. *In* Fisheries in the Caribbean. Caribb. Comm., Cent. Secr., Rep. Fish. Conf. Kent House, Trinidad, Mar. 24-28, 1952, Kent House, Port-of-Spain, Trinidad, p. 147-165.

151. 1953. The pineal apparatus of tunas and related scombrid fishes as a possible light receptor controlling phototactic movements. Bull. Mar. Sci. Gulf Caribb. 3: 168-180.

152. 1961. A review of the tuna fishes of the subgenera *Parathunnus* and *Neothunnus* (genus *Thunnus*). Ann. Mus. Civ. Stor. Nat. Genova 72: 126-148.

153. 1964. Key to the Atlantic Ocean tuna fishes of the genus *Thunnus*. Proc. Symp. Scombroid Fishes, Mar. Biol. Assoc. India, Sympos. Ser. 1: 427-428.

154. ROBINS, C. R.
1958. Check list of the Florida game and commercial marine fishes including those of the Gulf of Mexico and the West Indies, with approved common names. Fla. State Board Conserv., Educ. Ser. 12, 46 p.

155. ROSA, H., JR.
1950. Scientific and common names applied to tunas, mackerels and spear fishes of the world with notes on their geographic distribution. A progress report on the compilation of scientific and common names of important food fishes. FAO, Washington, D.C., 235 p.

156. ROSE, M. M. (COMPILER).
1968. Illustrated list of common and scientific names of fishes from the Gulf of Mexico in Latin, Spanish, Russian, and English. U.S. Department of Commerce, Joint Publications Research Service, 46741, 46 p. Reproduced from the Russian language monograph *Meksikainskii Zaliv* (Gulf of Mexico), published by the U.S.S.R. All-Union Research Institute of Marine Fisheries and Oceanography (VNIRO), and the Cuban Institute of Fisheries Research (CIP), *Pishchevaia Promyshlennost* Publishing House, Moscow, 1967, 231 p.

157. ROUTH, M. H.
1958. Rapport provisoire au gouvernement d'Haiti sur les pêches maritimes en Haiti. FAO Exp. Prog. Tech. Assoc. 721, 98 p.

158. 1959. Haiti's fisheries and their potential development. Proc. Gulf Caribb. Fish. Inst., 11th Annu. Sess., p. 123-128.

159. SCHUCK, H. A.
1951. Notes on the dolphin *(Coryphaena hippurus)* in North Carolina waters. Copeia 1951: 35-39.

160. SCHUCK, H. A., and F. J. MATHER, III.
1951. A blackfin tuna *(Parathunnus atlanticus)* from North Carolina waters. Copeia 1951: 248.

161. SHOMURA, R. S.
1966. The Atlantic tuna fisheries, 1963. Commer. Fish. Rev. 28(5): 1-11.

162. SOARES, L. H., and J. F. DA CRUZ.
1967. Sôbre a biometria da albacora *Thunnus atlanticus* (Lesson), da costa do estado do Rio Grande do Norte. Bol. Inst. Biol. Mar., Univ. Rio Grande Norte 4: 33-42.

163. SOUTH, J. F.
1845. *Thunnus. In* Smedley, Rose, and Rose (editors), Encyclopedia Metropolitana 25: 620-622.

164. SPRINGER, S.
1957. Some observations on the behavior of schools of fishes in the Gulf

of Mexico and adjacent waters. Ecology 38: 166-171.

165. 1957. Tuna resources of the tropical and sub-tropical western Atlantic. Trans. Am. Fish. Soc. 85: 13-17.

166. SPRINGER, S., and H. R. BULLIS, JR.
1956. Collections by the *Oregon* in the Gulf of Mexico. U.S. Fish Wildl. Serv., Spec. Sci. Rep. Fish. 196, 134 p.

167. SQUIRE, J. L., JR.
1962. Distribution of tunas in oceanic waters of the northwestern Atlantic. U.S. Fish Wildl. Serv., Fish. Bull. 62: 323-341.

168. 1963. Distribution of tuna species in the oceanic northwest Atlantic. FAO Fish. Rep. 6: 1477-1514.

169. SUAREZ CAABRO, J. A.
1957. The present situation in the fishing industry of Cuba. Proc. Gulf Caribb. Fish. Inst., 9th Annu. Sess., p. 136-143.

170. SUAREZ CAABRO, J. A., and P. P. DUARTE BELLO
1961. Biología pesquera del bonito *(Katsuwonus pelamis)* y la albacora *(Thunnus atlanticus)* en Cuba. I. Inst. Cubano Invest. Tecnol, Ser. Estud. Trab. Invest. 15, 151 p.

171. TAMURA, T., and W. J. WISBY.
1963. The visual sense of pelagic fishes especially the visual axis and accommodation. Bull. Mar. Sci. Gulf Caribb. 13: 433-448.

172. TAYLOR, H. L.
1947. Fisheries in St. Lucia, British West Indies. U.S. Fish Wildl. Serv., Fish. Leafl. 228, 2 p.

173. TIBBO, S. N., and R. A. McKENZIE.
1964. Tunas and bonitos. Trade News 17(2): 7-10.

174. VICENTE, W.
1966. La pesca del bonito. Mar Pesca, February 1966, p. 22-27.

175. VOZ DO MAR, RIO DE JANEIRO.
1927. A albacora—o atum das costas Brasileiras. Rio de J. Voz do Mar 7(66): 17-19.

176. WATSON, M.
1962. Tuna larva. Oceanus 9(1): 19.

177. WATSON, M. E.
1964. Tunas (genus *Thunnus*) of the western North Atlantic. Part I. Key to the species of *Thunnus* based on skeletal and visceral anatomy. Proc. Symp. Scombroid Fishes, Mar. Biol. Assoc. India, Sympos. Ser. 1: 389-394.

178. WHITELEATHER, R. T.
1952. Application of recent technical knowledge to exploration and development of new fisheries. *In* Fisheries in the Caribbean. Caribb. Comm., Cent. Secr., Rep. Fish. Conf. Kent House, Trinidad, Mar. 24-28, 1952, Kent House, Port-of-Spain, Trinidad, p. 84-89.

179. WHITELEATHER, R.T., and H.H. BROWN.
1945. An experimental fishery survey in Trinidad, Tobago and British Guiana, with recommended improvements in methods and gear. Anglo-Am. Caribb. Comm., Washington, D.C., 130 p.

180. YABE, H., Y. YABOTA, and S. UEYANAGI.
1963. Comparative distribution of eggs, larvae and adults in relation to biotic and abiotic environmental factors. FAO Fish. Rep. 6: 979-1009.

ADDITIONAL REFERENCES

ANONYMOUS.
1956. Report on a longline cruise, May 1956. Marine Laboratory, Univ. Miami, Rep. 56-17, 8 p. [Processed.]

MONNET, M. R.
1912. Chronique. Pêche du thon et autres poissons dans la Guadeloupe. Bull. Enseign. Pêche Marit. 17(1): 103-104.

MOWBRAY, L. L.
1935. Description of the Bermuda large-eyed tuna *Parathunnus ambiguus*, n. sp. Government Aquarium, Bermuda, 3 p. [Privately printed pamphlet.]

WATSON, M. E., and F. J. MATHER, III.
1961. Species identification of juvenile tunas (genus *Thunnus)* from the Straits of Messina, northwestern Atlantic, and the Gulf of Mexico. Paper presented to the Pacific Tuna Biology Conference, Honolulu, 4 p.

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salmon (models I and II), by Daniel W. Bates and John G. Vanderwalker, pp. 1-5, 6 figs., 1 table; 2d paper, Design and operation of a cantilevered traveling fish screen (model V), by Daniel W. Bates, Ernest W. Murphey, and Earl F. Prentice, 10 figs., 1 table.

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